REMARKS

Claims 1-6 remain in the application and have been amended hereby.

As will be noted from the Declaration, Applicants are citizens and residents of Japan and this application originated there.

Accordingly, the amendments made to the specification are provided to place the application in idiomatic English, and the claims are amended to place them in better condition for examination.

An early and favorable examination on the merits is earnestly solicited.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE ABSTRACT OF THE DISCLOSURE

Please amend the Abstract by rewriting same to read as follows.

[The present invention provides a] A wide-band array antenna using a single real-valued multiplier for each antenna element[, which] is simple in construction and suitable for [WCDMA] wide-band code division multiple access (WCDMA) mobile communication [system] systems. A rectangular array antenna is formed by N x M antenna elements. Each antenna element has a frequency dependent gain which is the same for all elements. Each antenna element is connected to [a] said single real-valued multiplier with a single real-valued coefficient, which is determined by properly selecting a number of points on a u-v plane defined for simplifying the design procedure according to the selected design algorithm [of the present invention].

IN THE CLAIMS

Please amend claims 1-6 by rewriting same to read as follows.

--1. (Amended) A wide-band array antenna comprising:

N x M antenna elements, and

a plurality of multipliers, one multiplier connected to each said antenna element, and each multiplier having a real-valued coefficient, wherein

[assuming that] when said antenna elements are placed at distances of d1 and d2 in [the] directions of N and M, respectively, the real-valued coefficient of each multiplier is C_{nm}, and by defining two variables as $v=\omega d_1 \sin\theta/c$, and $u=\omega d_2 \cos\theta/c$, the response of said wide-band array antenna can be given as:

$$H(u,v)=\sum_{n=1}^{N}\sum_{m=1}^{M} C_{nm} e^{j(n-1)v} e^{-j(m-1)u} \qquad (5)$$

by [appropriately] selecting points (u_{0l}, v_{0l}) on [the] a u-v plane according to a predetermined angle of beam pattern and [the] a center frequency of a predetermined frequency band, [the] elements b_l of an auxiliary vector B = [b_1, b_2, ..., b_L] (L << N x M) [can be] are calculated and the coefficient C_{nm} of each said multiplier corresponding to each antenna element [can be] is calculated as [follows]

$$C(n,m)=\sum_{l=1}^{L} G_a^{-1} b_l e^{-j(n-1)v_{0l}} e^{j(m-1)u_{0l}} \qquad (17)$$

--2. (Amended) [A] The wide-band array antenna as set forth in claim 1, wherein

[said] each of said antenna [element] elements has a frequency dependent gain which is the same for all antenna elements.

--3. (Amended)[A] The wide-band array antenna as set forth in claim 1, wherein

[the gain of the antenna element has] each of said antenna elements has a gain set to a predetermined value at a predetermined frequency band, including the center frequency, [and] at a predetermined angle.

--4. (Amended)[A] The wide-band array antenna as set forth in claim 1, further [comprises] comprising

an adder for adding [the] output signals from said plurality of multipliers.

--5. (Amended)[A] The wide-band array antenna as set forth in claim 1, wherein

a signal to be sent is input to said plurality of multipliers and [the] an output signal of each said multiplier is applied to [the] a corresponding antenna element.

--6. (Amended)[A] The wide-band array antenna as set forth in claim 1, wherein

said selected points (u_{0l}, v_{0l}) on the u-v plane for computing

the elements of said auxiliary vector B are symmetrically distributed on the u-v plane.